System Advisor Model (SAM) Beta 2012.3.26

SAM Beta 2012.3.26 includes many of the features and changes that will be included in the Spring 2012 release of the System Advisor Model.

Please send us feedback preferably by posting on the SAM support forum, or by sending a message to mailto:sam.support@nrel.gov.

To download and install the Beta version:

1. On the SAM website, click Log On at the top right corner of the page, or, if you do not have an account, click Register, and complete the short registration form. (You will receive a confirmation email with your password after registering).
2. On Downloads page, click the link under **Beta Version: 2012.3.36** for the version (Windows or Mac OS) that you would like to download.
3. After downloading the installation file, install SAM. If a version of SAM is already installed on your computer (the current version is SAM 2012.12.2), we recommend installing the Beta version in a different folder so that you can run both versions.
4. To run the Beta version, start the software and then open a project file. The Beta version will not run when you double-click on a .zsam file.

When you finish reviewing the Beta version, you can uninstall it without affecting other versions installed on your computer. The Beta version will expire and stop working after May 23, 2012.

Highlights

- We've converted the code for the PV models to a new simulation engine (written in C++ instead of FORTRAN) that makes simulations run faster, and makes it easier for us to maintain the code.
- New high-concentration photovoltaic (HCPV) model.
- Reports: New report templates available for PV, troughs, towers, and wind. Improved report template editor allows for equations, number formatting, and some simple evaluation statements.
- New PVWatts option allows using POA irradiance data as input on the PVWatts Array page and uses wind speed and ambient temperature data from weather file specified on Climate page.

- "Component-based Models" name changed to "Flat Plate and Low-X PV."
- A new solar water heating system model* that uses 1) a mixed tank model during solar collection hours and 2) a two variable-volume node tank model during non-collection hours to model stratification during hot water draws.

SAM Beta 2012.3.26 Detailed Features List

General

P50/P90 Analysis: Removed P10 values; P50 and P90 values calculated for all metrics, not just annual energy; Graphs and tables display actual year (1971) instead of year number (11); Data table Single Value list shows P50 and P90 values including empirical P values, normal P values, minimum, maximum, and standard deviation for all variables; P50/P90 Analysis page shows number of years in data set and missing years; Annual energy graphs show energy value after availability factor applied.

Reports: New report templates available for PV, troughs, towers, and wind. Improved report template editor allows for equations, number formatting, and some simple evaluation statements.

Remove obsolete Advanced (code generation) option from Case menu in anticipation of fully documented API planned for later in 2012.

Hide System Summary page. This page displayed calculated values from other pages and was confusing because the values on the page could not be changed.

Bug fix: Pressing Enter key from a search box displayed the Technology and Market window.

Financial Models

Revise financial model descriptions in Tech and Market window.

Photovoltaic (PV)

New Simulation Engine: We've converted the code for the PV models to a new simulation engine (written in C++ instead of FORTRAN) that makes simulations run faster, and makes it easier for us to maintain the code.

New Incident Radiation Algorithm: All PV models use incident radiation calculations from PVWatts. Earlier versions of the component-based PV model used a different algorithm.

New high-concentration photovoltaic (HCPV) model. The new model is similar to the current Concentrating PV Simple Efficiency Model, but has new inputs that are more appropriate for CPV technologies, and is implemented as a separate model from the flat-plate PV model.

"Component-based Models" name changed to "Flat Plate and Low-X PV" to help distinguish between the flat-plate and concentrating PV models.

PV azimuth convention changed to match PVWatts: North = 0, East = 90, South = 180, and West = 270 degrees in both the southern and northern hemispheres.

Plane-of-array Irradiance as Input: This new option on the PVWatts Solar Array page allows using POA irradiance data as input on the PVWatts Array page and uses wind speed and ambient temperature data from weather file specified on Climate page.

Bug fix: PV model AC derates were not applied.

Solar Water Heating

A new solar water heating system model that uses 1) a mixed tank model during solar collection hours and 2) a two variable-volume node tank model during non-collection hours to model stratification during hot water draws.

Concentrating Solar Power (CSP)

Physical trough model correction to header and runner pressure drop calculation: For the default case, this change results in an increase of about 8% in pressure drop across the field, and 0.2% decrease in annual energy in the default case. The increase will be slightly higher for a field with more that the default of 2 field subsections.

Power tower field optimization algorithm (DELSOL): Decrease weighting on flux at ends of the receiver and consider absorptivity. The net effect of these changes on the total annual energy calculated by the molten salt model is less than 1%, and a 5% increase for the direct steam model. Also increase decimal precision of the heliostat image error so that default value of 0.00153 rad is correctly read instead of being truncated to 0.0015.

Power tower direct steam, Tower and Receiver page: Replaced the three boiler, superheater, and reheater absorptivity variables with a single Coating Absorptance value, and changed its default value from 0.95 to 0.94. If you open a file saved with SAM 2011.12.2, SAM will populate the new Coating Absorptance variable with the value of the old "Absorptivity of boiler tubes" variable.

Power tower direct steam, Tower and Receiver page: Replaced the three boiler, superheater, and reheater emissivity variables with a single Coating Emittance value. If you open a file saved with SAM 2011.12.2, SAM will populate the new Coating Emittance variable with the value of the old "Emissivity of boiler tubes" variable.

Power tower direct steam, Parasitics page: Changed the default "Aux heater,boiler parasitic" Coeff 1 value from 0.571 to 0.517.

Results: Changed names of results variables that appear in graphs and tables.

Wind

Utility Scale Wind: Fixed two bugs that resulted in capacity factor being incorrectly calculated when modeling a single turbine, and resulted in an error message being displayed under certain conditions when changing the value of the Losses per Turbine and Wind Farm Losses variables.

Geothermal

Resource Data: Resolve web server issues with geothermal resource data and updates.

Biopower

User Interface Changes: Some input pages rearranged and streamlined for clarity.

Emissions Comparison page changed to Life-Cycle Impacts page with new inputs to specify the plant's life-cycle emissions from transportation and fuel processing. fuel, transportation mode, and pre-processing method. SAM calculates carbon dioxide emissions from fuel transportation, collection, and combustion, and biomass uptake. *This page does not affect the performance or cost model in any way. It is purely informational.*

Removed plant nameplate capacity option on the Plant Specs page because it was confusing. With this option, SAM Effectively "back-calculated" the amount of biomass used to achieve a plant of the specified size and the corresponding collection radius.

Best regards, The SAM Team.